

43-3.06 Shoulder Superelevation

43-3.06(01) High Side Shoulder

On the high side of superelevated sections, the following criteria will apply to the shoulder slope:

1. Typical Application. The high-side shoulder will be sloped as follows:
 - a. If the superelevation rate on the curve is 4% or less, typically use 4% (its normal cross slope).
 - b. If the superelevation rate on the curve is greater than 4% but less than or equal to 6%, typically use 2% down away from the traveled way.
 - c. If the superelevation rate on the curve is greater than 6%, typically use 1% towards the traveled way.
 - d. Where the paved median shoulder is the high-side shoulder and is 1.2 m or narrower, it should be sloped in the same plane as the travelway. See Figure 43-3M, Paved-Shoulder Cross Slopes, Superelevated Section, With Underdrains; or Figure 43-3N, Paved-Shoulder Cross Slopes, Superelevated Section, Without Underdrains, for more-specific information.
2. Maximum Rollover. Where the typical application cannot be provided, the high-side shoulder must be sloped such that the algebraic difference between the shoulder and adjacent travel lane will not exceed 8%.
3. Shoulder as Deceleration Lane. At some intersections, drivers may use a paved shoulder as a right-turn lane on a superelevated horizontal curve. Chapter Forty-six presents cross slope breakover criteria between a turning roadway and a through travel lane at an intersection at-grade. Where the shoulder is used by turning vehicles, the designer should limit the shoulder rollover to the turning roadway breakover criteria (4% to 5%).

43-3.06(02) Low Side (Inside) Shoulder

On the low side of a superelevated section, typical practice is to retain the normal shoulder slope until the adjacent superelevated travel lane reaches that slope. The shoulder is then

superelevated concurrently with the travel lane until the design superelevation is reached (i.e., the inside shoulder and travel lane will remain in a plane section).

43-3.07 Reverse Curves

Reverse curves are two closely spaced simple curves with deflections in opposite directions. For this situation, it may not be practical to achieve a normal crown section between the curves. A plane section continuously rotating about its axis (e.g., the centerline) can be used between the two curves, if they are close enough together. The designer should adhere to the applicable superelevation development criteria for each curve. The following will apply to reverse curves:

1. Normal Section. The designer should not attempt to achieve a normal tangent section between reverse curves unless the normal section can be maintained for a minimum of two seconds of travel time, and the superelevation transition requirements can be met for both curves.
2. Continuously Rotating Plane. If a normal section is not provided, the pavement will be continuously rotated in a plane about its axis. In this case, the minimum distance between the PT and PC will be that needed to meet the superelevation transition requirements for the two curves (e.g., distribution of superelevation runoff between the tangent and curve).

43-3.08 Broken-Back Curves

The broken-back arrangement of curves with a short tangent section between two curves in the same direction should be avoided except where unusual topographic- or right-of-way considerations make other alternatives impractical.

43-3.09 Bridges

If practical, horizontal curves and superelevation transitions should be avoided on bridges. The designer should place a curve on a bridge if this results in a more desirable alignment on either approaching roadway. In some cases, superelevation transitions are unavoidable on bridges; however, if properly designed and constructed, most bridges will operate adequately where this occurs.